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Comparison of Conversation and Narrative Language Abilities in Children with Autism: Diagnostic and Therapeutic Considerations

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COMPARISON OF CONVERSATION AND NARRATIVE LANGUAGE ABILITIES IN CHILDREN WITH AUTISM: DIAGNOSTIC AND THERAPEUTIC CONSIDERATIONS.

by

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ABSTRACT

COMPARISON OF CONVERSATION AND NARRATIVE LANGUAGE ABILITIES IN CHILDREN WITH AUTISM: DIAGNOSTIC AND THERAPEUTIC CONSIDERATIONS.
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Under the Supervision of John Heilmann, Ph. D.

Many children with autism experience significant difficulty with comprehension and expression of spoken language. Speech-language pathologists (SLPs) require sensitive assessments to describe the unique profiles of individual clients with autism so that appropriate treatments can be prescribed. Language sample analysis is a current best-practice for describing language profiles in children with language difficulties, though there is a limited literature describing clinical best-practices for children with autism. The purpose of this study was to analyze the difference in conversation and narrative language abilities in children with autism. Language ability was also analyzed in comparison to age-matched typically developing peers. This goal of this analysis was to assist in determining the context that reveals language deficits in children with autism to be utilized for diagnostic considerations and planning for intervention. Three children with autism, aged 6, participated in this study. Children were observed having a conversation with their parent or SLP and retelling a story from a wordless picture book originally told by their parent or SLP. Both samples were analyzed for grammatical and semantic errors. The conversation sample was analyzed for contingent responses, while narrative samples

were analyzed for story grammar elements and organization. The analysis was completed using the Systematic Analysis of Language Transcripts (SALT) database. The microstructural analysis revealed that the participants' relative weaknesses surrounded the complexity and accuracy of their utterances. The participants had difficulty producing syntactically accurate conversation samples demonstrated by a high number of word and utterance level errors. Within the narrative samples, the children produced utterances with relatively simple grammar and syntax demonstrated by very low MLU values compared to their peers. The macrostructural analysis of conversation samples revealed that 2 of the 3 participants produced half contingent and half non-contingent responses. Of those contingent responses, the majority were responses to wh-questions, despite one participant whose utterances were primarily self-expansions. The macrostructural analysis of narrative samples using the Narrative Scoring Scheme (NSS) revealed that the participants were at floor. Two participants achieved minimal scores for an introduction while the other participant received a minimum score for a conclusion. All narratives lacked cohesion and story grammar elements. Overall, the participants in this study did relatively worse in the narrative sample possibly due to the fact that it requires a higher level of language. Further research is needed to generalize these findings.

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Chapter 1: Review of the Literature

Overview of Autism Spectrum Disorders

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by social communicative impairments and repetitive behaviors. Estimates of the population affected by autism range from 1% to 1 in 68 children (American Psychiatric Association, 2013; CDC, 2014). Autism affects people of all ethnic, racial, and socioeconomic groups, but is five times more common in boys than0 in girls (Center for Disease Control, 2014).

DSM-5 Criteria. The Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), of the America Psychiatric Association is a handbook that lists the diagnostic criteria used to diagnose mental disorders and is used by a variety of health professionals to assist with clinical diagnostic protocols. The DSM-5 classifies autism as a "persistent impairment in reciprocal social communication and social interaction, and restricted, repetitive patterns of behavior, interest, or activities." These symptoms are not due to cognitive disability, though autism and cognitive disability can co-occur, and must be present early on in development. Restricted and repetitive behaviors occur across a variety of modalities (e.g., motor movements, use of objects, or speech) and are characterized by inflexibility to change, transitions, or new situations, limited interests that are atypically concentrated, and sensory reactivity or an interest in sensory input or output. Language impairments in autism are broadly classified by deficits in reciprocal social communication, poor use of non-verbal behaviors, such as eye contact and gestures, impaired ability to pick up on social cues, and difficulty being an appropriate participant in relationships (American Psychiatric Association, 2013).

Language Difficulties in Autism.

Language difficulties are often the first presenting symptom in an autism spectrum disorder and are important in predicting prognosis and course of development for children with the disorder (Kjelgaard & Tager-Flusberg, 2006). A wide range of studies have identified that children with autism have significant deficits across multiple domains of language (e.g., Eigsti, Bennetto, & Dadlani, 2007; Gerenser, 2009; Landa & Goldbert, 2005; Lee, Hobson, & Chiat, 1994; Perovic, Modyanova, & Wexler, 2011; Philofsky, Fidler, & Hepburn, 2007; Tager-Flusberg, 2000; 2006; 2007). To provide a more detailed perspective of the types of language deficits experienced by children with autism, the review of literature is organized according to the three major domains of language identified by Bloom and Lahey (1978): Form (i.e., grammar and syntax), content (i.e., vocabulary and semantics), and use (i.e., pragmatics).

Grammatical Morphology. As described by Brown (1973), the fourteen grammatical morphemes in order of acquisition include present progressive *-ing*, prepositions in and on, regular plural *–s*, irregular past tense, possessive *–s*, uncontractible copula, articles *a* and *the*, regular past tense, third person regular present tense, third person irregular present tense, uncontractible auxiliary, contractile copula, and contractible auxiliary. Children with autism are known to omit grammatical morphemes when compared to typically developing peers and have a shorter mean length of utterance in morphemes (MLU-M) when compared to age-matched peers who had developmental delays or were typically developing (Eigsti et al., 2007; Gerenser, 2009). In her study of 3;0 to 6;0 year old children with autism, Eigsti and collegues (2007) concluded that these deficits in children with autism were not due to limited talkativeness, but rather concluded that the impairments were the result of less complex grammatical morphology. Tager-Flusberg (2006) compared conversational language samples of high-functioning children with autism with normal language ability and impaired language ability and children with specific language impairment (SLI) whose ages averaged 7;5. These language

samples were coded for use of grammatical morphemes. Tager-Flusberg found that children with autism with impaired language ability and children with SLI scored lower in use of third person singular when compared to children with autism with normal language abilities. These difficulties persist beyond the age of mastery of grammatical morphemes for typically developing children, according to Brown (1973).

Syntax. Multiple studies have documented a range of difficulties for children with autism in the area of syntax. Eigsti et al. (2007) identified that children with autism used a simpler sentence structure, but typically did not make syntactic errors. In a play-based language sample, 3 to 6 year-old children with autism used syntactically less complex language compared to age-matched, typically developing and developmentally delayed peers (Eigsti et al., 2007). A study by Lee et al., (1994) that assessed pronoun use for a group of 8;4 to 25;8 year old children and adults with autism revealed that the children with autism often reversed personal pronouns. For example, if a child wanted to go outside, he or she might say "Wanna go outside?" instead of "I want to go outside." Perovic et al., (2011) also found that children with autism ages 6;6 to 17;0 had difficulty with reflexive pronouns as well and interpreted 'himself' as 'him', which led to difficulty understanding to whom the speaker was referring. Perovic et al., (2011) concluded that such syntactic difficulties were due to the linear and rigid use of grammatical rules.

Semantics. In a detailed analysis of children's semantic ability, Tager-Flusberg (2000; 2007) identified that children with autism had semantic difficulty when comprehending and using more abstract and emotionally-laden vocabulary, including mental state terms (e.g., think, know, believe, remember) and social-emotional terms (e.g., worried, excited, hopeless, proud). In terms of vocabulary diversity, Eigsti et al., (2007) documented that while children with autism

used a greater number of words during a conversational speech sample, they used much simpler words when compared to their typically developing peers.

Pragmatics. Pragmatics for the purpose of social communication is often the most impaired area of language for children with autism and is a central part of the diagnostic criteria for the disorder (Gerenser, 2009). Pragmatics can be classified into verbal and non-verbal categories. Non-verbal communication, such as gestures, facial expressions, body language, and vocal characteristics, are often significantly impaired (Philofsky, Fidler, & Hepburn, 2007). Facial expressions are often emotionless, or show an inappropriate emotion, and gestures to accompany conversation are often limited (Philofsky et al., 2007). In a summary of linguistic characteristics of children with autism, Tager-Flusberg (2000) indicates that there are difficulties understanding figurative language (e.g. It's raining cats and dogs) and children often interpret such language literally.

Idiosyncratic language. Idiosyncratic language refers to the use of traditional words and phrases in atypical ways to convey specific meanings. Though these words and phrases may seem odd in conversation, they are used functionally by the speaker (Volden & Lord, 1991). For example, a child may take a phrase they heard on a television show and use it in other situations where the phrase may not be appropriate. If a child frequently watches the show *Mickey Mouse Clubhouse* and heard Mickey Mouse say the phrase "Remember, Donald, you have to be nice!" he may repeat the phrase when initiating wrestling with his brother, though it is inappropriate because his brother's name is not Donald and he is the one who is not being 'nice', the meaning is significant to the child.

Neologisms. Neologisms are non-words or words that do not occur in the standard adult lexicon of native speakers. These made up words have significance to the child, but are odd in

conversational use (Volden & Lord, 1991). A common example is the word Google used as a verb.

Echolalia. Echolalia is repetition of speech sounds, words, phrases, or intonation patterns of others. Echolalia can be immediate, (repeated right after someone else's speech), or delayed, (repeated a length of time after they heard the original message) (Ganos, Ogrzal, Schnitzler, & Münchau, 2012). Echolalia was thought to be a stimulatory behavior, but has recently been thought of as functional; the repetition of speech may be how the child learns to use speech/language appropriately (Gerenser, 2009).

Autism as a Spectrum Disorder.

Autism is a spectrum disorder, which is defined as a range of symptoms that may present themselves in various combinations (Maser & Akiskal, 2002). There are a variety of presentations of children with an autism spectrum disorder resulting in differences in functional performance. On one end of the spectrum, children may have cognitive disabilities and distracting physical stimulatory behaviors; on the other end of the spectrum, children may have advanced cognitive function and exhibit no stimulatory behaviors (Tager-Flusberg, 2007).

Previous diagnostic criteria used autism spectrum disorder as an umbrella term with autism, Asperger's syndrome and pervasive developmental disorder-not otherwise specified (PDD-NOS) as subgroups. The autism subgroup was classified as having impairments in social communication and restrictive and repetitive behaviors, which still included a wide variety of functionality. Asperger's syndrome was classified as a more mild form of autism with no delay in language acquisition and cognitive development. PDD-NOS was a term used for people who had some autism symptomatology, but not enough to be classified as a true autism spectrum disorder (American Psychiatric Association, 2000). Under the DSM-5, autism spectrum disorder

is one diagnosis without subgroups. If the person does not meet a number of criteria for all of the categories of symptomatology, they do not have an autism spectrum disorder (American Psychiatric Association, 2013).

Spectrum of Language Ability. Just as there is a spectrum of abilities in in functional performance for children with autism, a spectrum of abilities is also observed in the domain of language. While multiple investigators have documented intact articulation skills in children with autism (Jarrold et al., 1997; Kjelgaard & Tager-Flusberg, 2001; Tager-Flusberg, 2007), the language profiles of children with autism are best described as a continuum of abilities (Jarrold et al., 1997; Kjelgaard & Tager-Flusberg, 2001; Lewis et al., 2007; Tager-Flusberg, 2007). In terms of overall language ability for children with autism, some studies have found that expressive language abilities are superior to receptive language abilities (e.g., McCann et al., 2007), while other studies have documented that receptive language abilities are superior to expressive language abilities (e.g., Jarrold, Coucher, & Russell, 1997; Lewis, Murdoch., & Woodyatt, 2007). By contrast, Kjelgaard and Tager-Flusberg (2001) found no difference in receptive and expressive language abilities in their sample of children with autism.

In addition to variability in the general language ability of children with autism, wide variability has been observed in each of the domains of language. Many studies have demonstrated variability in the grammar abilities in children with ASD (Jarrold et al., 1997, Kjelgaard & Tager-Flusberg, 2011; Landa & Goldberg, 2005; Perovic, Modyanova, & Wexler, 2013; Tager-Flusberg, 2007). For example, Allen, Haywood, Rajendran, & Branigan (2011) found significant impairments in grammatical morphemes, reflexive and personal pronouns, and sentence complexity in a group of 12 children with autism, while Eigsti, Bennetto, & Dadlani, (2007), and Gerenser (2009) found syntax to be a relatively unimpaired language function in children with autism when compared to deficits in other areas of language. While some

investigators have labeled semantic ability a relative strength for children with autism spectrum disorders (e.g., Gerenser, 2009), a more detailed study of semantic ability revealed that children with autism had substantial difficulty with more abstract vocabulary (Tager-Flusberg, 2000; 2007). In the area of pragmatics, Tager-Flusberg (2000; 2007) found that communication initiation for requesting, labeling, protesting, and self-regulation were relatively unimpaired in their sample of children with high-functioning autism, while Jarrold et al. (1997) and Kjelgaard & Tager-Flusberg (2001) noted that, in general, children with autism had difficulties in using language for social purposes.

Clinical Implications of Variability in Language Skills in Children with Autism. Speech-language pathologists (SLPs) provide services for a wide variety of communication disorders (e.g; speech sound production, resonance, voice, fluency, language, cognition, feeding, and swallowing; ASHA, 2007). Within each individual communication disorder, there is substantial heterogeneity across individual children, with variability reflecting the severity of disorder, impact on functional outcomes, and comorbid communication deficits (Paul & Norbury, 2012). Given this variability, careful and comprehensive assessment is required to fully conceptualize the disorder and to prescribe an appropriate individualized plan for treatment (Haynes & Pindzola, 2011). Because there is wide variability in the language abilities for children with autism, their treatment must also be individualized (Lewis, Murdoch, & Woodyatt, 2007). Kjelgaard and Tager-Flusberg (2001) summarize that at one end of the language ability spectrum, children may have vocabulary, grammar, and articulation skills within normal limits, and on the other end of the spectrum, many children remain non-verbal. Therefore, the needs for higher functioning children are different than for lower functioning children. Loucas, Charman, Pickles, Simonoff, Chandler, Meldrum & Baird (2008) conducted a study on a group of 97 nine to 14 year old children with autism. They concluded that both children with more

impaired language and children with normal language had pragmatic impairments. They also concluded that both groups had low social adaptive abilities, but the children who had lower language skills also had delayed everyday adaptive communication and daily living skills (Loucas et al., 2008). In order to prescribe appropriate treatment, an accurate description of abilities is needed. To obtain an accurate and thorough description of abilities, comprehensive assessment must be performed (Tomblin, Morris, & Spriesterbach, 2000).

Assessment of Language in Children with Autism

Given the heterogeneity of language profiles observed in children with autism, clinicians require sensitive language assessments to effectively characterize the language skills of children with autism to assist with treatment planning. A wide range of language assessment scales are available, including standardized assessments, developmental scales, interviews, questionnaires, behavioral observations, and behavioral observations (Paul & Norbury, 2012). Within the comprehensive clinical evaluation, each assessment type has strengths and limitations.

Norm-Referenced Assessment. Norm-referenced tests compare an individual child's language ability with comparison data that were established by presenting a series of standardized items to a large group of children with normal language development. Through standardization, test developers establish benchmarks for an acceptable range of scores for the age range that the assessment targets. Norm-referenced tests provide a meaningful comparison of a child's performance in relation to his or her peers and are often effective at identifying children as having a significant impairment (Paul & Norbury, 2012).

Though norm-referenced assessments provide information on the presence of a communication disorder, a true description of the problem may not be obtained if these assessments are used in isolation and inappropriate treatment goals may be established

(McCauley & Swisher, 1984). McCauley and Swisher (1984) argued that creating a child's language profile from norm-referenced assessments is problematic as a difference in scores does not reflect a difference in language behavior. Because norm-referenced tests use a limited number of test items, results are not comprehensive enough to reveal strengths and weaknesses in individual language skill areas. In addition to limited test items, norm-referenced assessments also assess a restricted range of communicative contexts, which are not naturalistic, but artificial (McCauley & Swisher, 1984).

Norm-referenced assessments may be particularly problematic for children with autism. Kjelgaard and Tager-Flusberg (2001) noted that during their research, children with autism had difficulty complying with standardized test batteries because of the use of echolalic speech, perseveration, and attention difficulties. Jarrold, Boucher & Russell (1997) also concluded from their research that the gaps between expressive and receptive language skills put children with autism at a disadvantage when completing standardized language assessments. Furthermore, most norm-referenced language tests assess vocabulary, grammar, phonology, and auditory memory, but do not address language use, which is a primary area of concern for children with an autism spectrum disorder (Bishop, Chan, Adams, Hartley, & Weir, 2000; Condouris et al., 2003). A thorough description of a child's pragmatic abilities is often not obtained through norm-referenced testing because the tasks typically do not assess language used in a functional context and is not a reflection of a child's true communication abilities (Paul & Norbury, 2012; Retherford, 2007). Without a thorough and authentic pragmatic assessment, a child with autism who is high-functioning might not meet the criteria to qualify for services due to his or her ability to perform well on vocabulary, grammar, phonology, and auditory memory tasks (Paul & Norbury, 2012). To get a more accurate and unbiased description of a child's abilities in specific

areas of language, informal criterion referenced assessments may be a useful alternative to formal testing (Botting, 2002).

Criterion-Referenced Assessment. A child's performance on criterion-referenced assessments is not compared to a normative sample, but rather to an established criterion via examination of a specific form of communication behavior. This type of assessment tends to be more informal and naturalistic when compared to norm referenced assessments and can also be tailored to meet an individual child's needs (Paul & Norbury, 2012). Since criterion-referenced assessments allow for evaluation within a more natural context, a child's use of language in everyday informal settings can be assessed, including a variety of pragmatic and discourse skills (Condouris et al., 2003).One particularly useful criterion referenced assessment that can be used to document a range of communicative functions is language sample analysis (LSA). Through LSA, and examiner has the option to assess children's language within functional communicative contexts, thus obtaining an authentic depiction of children's language ability (Condouris et al., 2003).

Overview of Clinical Language Sampling

Naturalistic language sampling is a means of collecting and measuring a child's expressive language abilities through a variety communicative contexts, such as having conversations, telling stories, and describing processes (Tager-Flusberg, Rogers, Cooper, Landa, Lord, Paul, & Yoder, 2009). Given the naturalistic nature of discourse analysis, assessments using LSA are often more authentic and culturally sensitive than norm-referenced testing (Westerveld, Gillon & Miller, 2004). Despite the apparent informality of language sampling procedures, measures from LSA have been shown to be reliable and highly effective in identifying children with language impairment (Heilmann, Miller, & Nockerts, 2010; Retherford, 2007). For example,

Heilmann et al. (2010) documented that measures calculated using the Systematic Analysis of Language Transcripts (SALT) were effective in identifying 244 children with language impairment.

Perhaps one of the greatest strengths of the LSA is its ability to simultaneously describe multiple dimensions of language; information on strengths and weaknesses in spoken language domains of pragmatics, semantics, syntax, and morphology can be analyzed (Heilmann & Malone, 2014; Tager-Flusberg et al., 2009; Westerveld & Gillon, 2010). Because LSA directly document's a child's ability to use language to communicate, it affords a direct examination of a child's pragmatic abilities. Pragmatic skills central to discourse ability available for analysis include the ability to effectively initiate conversations, organize discourse, take the listener's perspective, maintain and shift topics, and take turns (Owens, 2010). In addition to a direct assessment of children's pragmatic skills, LSA can be used to document children's language use at the microstructure level, including use of syntactic structures, morphology, and lexical skills (Owens, 2010).

Since language sampling is merely a sample of a child's language, it must be elicited in such a way that it is representative of the child's broader language abilities (Owens, 2010). Language samples can be obtained in a variety of discourse contexts, including conversation, narrative, and expository). For a representative sample, the context must be meaningful to the child and developmentally appropriate. The most commonly used clinical protocols are conversation and narration (see Owens, 2010 for a review).

Conversational Language Sampling. Conversational language sampling provides a precise description of a child's language during conversational exchanges. A conversational sample is often taken during free-play with the child in the context of informal conversation,

where SLPs can probe for the type of responses they are looking for (Owens, 2010). For example, the use of open-ended questions and comments, while following the child's lead during play, elicit longer and more descriptive responses from the child (Owens, 2010). Conversations can be centered around objects/toys in the immediate environment with which the child is playing or familiar topics such as holidays and classroom activities. The child's conversational discourse organization can be analyzed efficiently since play-based and familiar topics are a natural means of communication for children (Heilmann et al., 2010).

Narrative Language Sampling. Narratives are a decontextualized form of discourse in which the child must organize and convey story information while maintaining the listener's interest. Narratives provide an uninterrupted sample of a child's language that must contain cohesive, temporal and causal events. The speaker also must be aware of the listener's knowledge in order to provide them with adequate information (Owens, 2010). According to Paul and Norbury (2012) and Botting (2002), narratives are educationally relevant and should be utilized in evaluating children with language disorders because it is sensitive to structural and pragmatic deficits that may be missed through standardized assessment. Narratives also allow for an evaluation of how a child perceives information and communicates the information to a listener using cognitive, social, and linguistic skills (Loveland, McEvoy, Tunali, & Kelley, 1990). In order to keep narratives structured for comparison across children and to ensure a shorter, but efficient sample, story retell can be used (Heilmann et al., 2010). Story retell involves telling a story that the child has just heard and can be performed with or without pictures. Westerveld and Gillon (2010) argue that retelling tasks are more complex because they involve memory processes underlying successful comprehension. While story retell provides a smaller sample, it produces the same developmental data as a full length narrative (Heilmann et al., 2010).

Comparing Conversation and Narration. Though conversational language sampling is a valid way of assessing a child's expressive language use, it may not elicit the highest level of language that the child is capable of producing (Wagner, et al., 2000). In a study performed with 268 typically developing, New Zealand children ages 4;5 to 5;7, Westerveld, Gillion, and Miller (2004) compared conversational, narrative, and story retell samples across age groups. The researchers found that regardless of age, children produced more words in narratives than in conversation. Additionally, the children produced longer sentences via story retell than personal narrative production. Westerveld and colleagues also found that when comparing conversation to story retell, children produced longer sentences and had more errors at the word-level during story retell. Similarly, Wagner, Nettelbaldt, Sahlén, and Niholm (2000) compared the conversational and narrative language samples of 28 children ages 4;11 to 5;4 with language impairment. They found that conversational samples yielded more intelligible utterances and more complex verb forms. In narratives the children had a higher MLU, used more grammatical morphemes and phrasal expansions, and had more mazes. Mazes include part or whole word repetitions, interjections, etc… that cause the utterance to be disfluent. These researchers concluded that lower fluency in narratives was due to the higher demands of planning, the increased number of forced productions, and longer units of speech than in conversation.

Language Sampling in Children with Autism Spectrum Disorder

Language sample analysis is an efficient method of assessing linguistic, cognitive, and social skills in children with autism and specifically highlights their discourse difficulties (Capps, Losh, & Thurber, 2000). Numerous studies have described the unique discourse profiles of children with autism through the study of both the conversational and narrative discourse (described in detail below).

Conversational Language Sampling in Children with Autism. Children with autism often have difficulty initiating, maintaining and repairing conversations and often use odd or inappropriate strategies during conversation (Bauminger-Zviely, Karin, Kimhi, & Agam-Ben-Artzi, 2014; Capps, Kehres, & Sigman, 1998; Loveland et al., 1990; Philofsky et al., 2007; Tager-Flusberg, 2007). They typically are able to initiate new topics once already engaged in a conversation, but do not always respond or respond appropriately to continue a conversation (Eigsti et al., 2007). For example, they tend to use socially inappropriate comments, imitate the speaker, and overuse stereotyped utterances, idiosyncratic language and neologisms, or give no response in an attempt to continue the conversation (Bauminger-Zviely et al., 2014; Capps et al., 1998; Philofsky et al., 2007; Tager-Flusberg, 1996; 2007). Communication in terms or requesting, protests, and self-regulation, often remain unimpaired (Tager-Flusberg, 2007). In one study, Tager-Flusberg and Anderson (1991), observed six three-year-old children with autism having a conversation with their mothers. The researchers found that children responded appropriately to yes/no questions. However, the children also were unaware that they were a source of new information for their mothers and discussed topics assuming their mothers knew the topic well (Tager-Flusberg, 2007). Children with autism tend to focus their conversations on present objects and actions rather than referring to the past or future. Perseveration of topics specific to their own interests is also noted in these children (Gerenser, 2009).

Children with autism respond more frequently to familiar listeners (Bauminger-Zviely et al., 2014; Tager-Flusber and Anderson, 1991). Bauminger-Zviely et al., (2014) found that high-functioning children with autism responded more often and more pragmatically appropriate to peers they considered a friend versus a nonfriend. These results were similar to those of Tager-Flusber and Anderson (1991) in which children responded more frequently to their mother versus an examiner. Bauminger-Zviely et al., (2014) stated that high-functioning children were

able to compensate for their lack of social-emotional appropriateness with their advanced cognitive skills. Nonverbal behaviors also were observed including, inappropriate facial expression and inability to maintain eye contact and gaze (Bauminger-Zviely et al., 2014). As generally described by Tager-Flusberg (2007), children with autism, despite their age, lacked mental state and emotional terms in their conversations, similar to research findings during narrative analysis (Baron-Cohen et al., 1986; Botting, 2002; Capps et al., 2000; Tager-Flusberg, 1999).

Narrative Language Sampling in Children with Autism. In order to assess higherlanguage abilities, many researchers have studied the narratives of children with autism and have noted unique patterns in the children's performance. Botting (2002) conducted a study with 5 children, ages 7;7 to 8;8 who had pragmatic language impairments. These children completed a retell of two different stories and researchers found that in general, children with pragmatic difficulties had poor story organization, fewer story episodes, and poor story grammar (Tager-Flusberg, 1996). In addition to story grammar elements, these children also omitted out mental state and emotional terms (Baron-Cohen et al., 1986; Capps et al., 2000Tager-Flusberg, 1999; 2007). Norbury and Bishop (2002) attempted to explain these differences in their study performed with 10 children with high-functioning autism aged 6;0 to 10;0 years old in comparison to children with specific language impairment and pragmatic language impairment. The children with autism performed more poorly on story telling tasks because of their inability to inference and draw conclusions or make predictions based on a story character's behavior, emotions, or an event in the story. Similarly, Diehl, Bennetto, & Young (2006) found that 17 high-functioning children with autism, (age; M= 8;8, SD= 2;1) were less likely than their age-matched typically developing peers to use causal explanations and emotional understanding when interpreting story events during a narrative elicitation task, but

were able to recall the main idea of the story. In a study by Baron-Cohen, Leslie, and Frith (1986) with 21 children with autism (age range: 6;1-16;9) it was discovered that the children labeled a character's emotion, but used causal explanations to explain behavior, not emotions. They also found that their participants used direct means of engaging the listener as compared to children with Down syndrome and typically developing peers instead of being creative and using story grammar transitions. A common theme among narratives of children with autism is that they did not take into account the listener's knowledge or needs while telling a story (Tager-Flusberg, 1999; 2007).

Assessing Grammar and Vocabulary through LSA in Children with Autism Spectrum Disorder. In addition to a direct analysis of children's pragmatic skills, LSA provides a unique assessment of the grammar and vocabulary skills of children with ASD. In fact, assessment of vocabulary and grammar through LSA may be the most effective method of revealing the language deficits of children with autism (Condouris et al., 2003). In a study of 44 children with autism, ages 4;0 to 14;0 years old, Condouris et al. (2003) found that their participants performed substantially further below the mean during spontaneous language samples when compared to standardized assessment. The researchers concluded that the children's difference in linguistic knowledge in discourse compared to structured testing may have been the reason for this discrepancy.

Summary and Rationale

Children with autism have significant difficulty with the comprehension and production of oral language. SLPs are intimately involved in assessment and treatment focusing on communication in children with autism. In order to identify the most appropriate communication-based goals, SLPs require sensitive assessment measures that accurately

describe the language skills of their clients with autism. While norm-referenced assessments may be appropriate to identifying the presence of disorders for these children, alternative assessment methods are needed to provide a rich description of relative strengths and weaknesses (McCauley & Swisher, 1984). Throughout the literature, language sample analysis has been described as an effective method of describing multiple dimensions of language (i.e., form, content, and use) when collected in a functional context (e.g., Paul & Norbury, 2012; Retherford, 2007). Language sampling may be particularly useful for describing the language skills of children with autism, given that it affords a unique perspective into children's pragmatic language skills (e.g., Botting, 2002; Tager-Flusberg, 1999). Furthermore, assessment using LSA may best illustrate the vocabulary and grammar deficits of children with autism (Condouris et al., 2003).

While the rich literature describing language sampling in children with autism supports its clinical use, there are limited data providing guidance on best practices for LSA with this population. One decision that clinicians must make when collecting a language sample from their clients is choosing the most appropriate elicitation context. Because differences in contexts can have a significant impact on language sample measures (e.g., Westerveld & Heilmann, 2013), clinicians need to choose the elicitation context carefully. For example, typically developing children produce more complex language in their production of narrative language samples when compared to conversational samples (Westerveld, Gillion, & Miller, 2004), so a SLP may choose to elicit a narrative sample if interested in capturing more complex language. To date, there has been no direct comparison between discourse genres in children with autism, which has important clinical implications. For example, if a particular context is more likely to generate lower language measures, that context may be chosen to best depict a child's communication impairment. Narratives may generate more complex language because they are

more structured and less interactive. On the other hand, since children with autism have overall difficulties in language, conversations may generate more complex language because they require less cognitive and language processing demands. Therefore, the goal of the present study was to directly compare measures from the language samples of children with autism across two contexts: conversations and narratives. This goal was achieved by addressing the following research questions:

1. Are the language sample measures produced by children with autism substantially lower than measures from samples available through a corpus of typically developing age-matched peers?
2. Is there a substantial difference in language sample measures for children with autism when comparing across conversation and narrative contexts?
3. Are measures from children with autism particularly low in a given context when compared to their typically developing peers?

Chapter 2: Methods

Participants

Three children with autism participated in this study. All children were 6 years of age and were able to verbally communicate with familiar adults. I selected the age of 6 years to facilitate comparisons to the SALT database, for which there are over 100 typically developing children in the same age range who completed the same protocol as was used in this study. Table 1 presents the demographics for each participant.

Table 1: Participant Demographics

Name	Age	Gender	Race/Ethnicity	Educational Diagnosis	Medical Diagnosis	Receiving ABA Services	Grade
Alex	6	M	Caucasian	Yes	Yes	Yes	K4
Dan	6	M	Polish/Spanish	Yes	Yes	Yes	1st
Nathan	6	M	Caucasian	Yes	Yes	No	K5

Recruitment. Recruitment began with children who were receiving state-funded intensive applied behavior analysis (ABA) treatment through all regional treatment centers that contracted with the state of Wisconsin. This recruitment strategy ensured that these participants had a medical diagnosis of autism. In the state of Wisconsin, children with a medical diagnosis of autism are eligible to receive state-funded intensive therapy using applied behavior analysis (ABA). After receiving IRB permission for the study through the University of Wisconsin-Milwaukee, I contacted each behavioral treatment company in the greater Milwaukee area to obtain permission to contact the potential participants. Flyers describing the study and providing contact information were distributed to families by company staff. The families were instructed to contact the principal investigator (PI) if they were interested in participating. Despite extensive advertising at multiple centers, only one participant, Alex, was recruited from the ABA centers. To increase the number of participants, I contacted a K-2nd grade charter school within the Milwaukee area. The SLP contacted parents whose children fit the inclusionary criteria. The parents of Dan and Nathan were interested, filled out the consent form and were recruited from the charter school.

Inclusionary Criteria. During the initial contact with each parent or school-based SLP, items in appendix A: Research Thesis Contact Log or B: School-Based Contact Log, were

completed which included the child's contact information and a language screener to determine eligibility for the study. I first ensured that each child had a medical and educational diagnosis of autism from a licensed psychologist. Alex's parent confirmed that her child was currently receiving state-supported ABA services, which confirmed the medical diagnosis of autism. The SLP confirmed that both Dan and Nathan had an academic and medical diagnosis of an autism spectrum disorder. Dan was receiving ABA services, but Nathan was not. All participants were receiving speech and language services.

A screening was completed by the parent or SLP to ensure that each child had the requisite verbal language skills in order to participate in the experimental tasks. Three of the six questions needed to be completed correctly in order for the participant to qualify. Alex's mother completed the screening and the school SLP completed the screening for Dan and Nathan. Six items were administered from the *Child Development Inventory* (Ireton, 1992) that describe the child's language functioning. Each of the three children qualified for the study based on at least three questions to document minimal oral language skills. That is, the parent and SLP confirmed that each child talked in sentences at least four words long, could retell short stories such as Little Red Riding Hood, answered questions like "What do you do with a cracker?," takes part in conversations, produces at least 2-3 word phrases, or that people understand much of what he says (see Appendix A for a full list of questions).

In addition, the Social Communication Questionnaire (SCQ) was completed to confirm that the child fit the profile of a child with an autism spectrum disorder (Rutter, M., Bailey, A. & Lord, C., 2003). A cutoff score of 15 is required for the child to be at risk for an autism spectrum disorder. Alex's mother completed the SCQ on his communication abilities and Dan and Nathan's school SLP completed a SCQ for each of them. Alex received a score of 20, Dan received a score of 29, and Nathan's score was 19, confirming their diagnoses of autism. None

of the children had a parent who reported that his/her child had a hearing loss or additional diagnosed developmental disability (such as Williams syndrome, Down syndrome, and Fragile x).

Comparison Samples

To provide a frame of reference for the children in the study, their performance on the language sampling tasks was compared to measures taken from transcripts that were produced by typically developing children who completed the same protocol. Students in this database were between the ages of 2;4 – 12;8 when they produced their samples and were recruited from California and Wisconsin. The children were deemed typically developing since they did not participate in special education services and their academic performance was rated as at least average by their teachers.

Method

The PI scheduled a time to complete the protocol within Alex's home. Study documents and a recorder were sent to the charter school for the SLP to complete the other protocols at the children's school. Prior to the home meeting, the PI provided the protocol training materials to the caregiver and SLP via email (see appendices E and F). During the home visit, the PI explained the study in detail, reviewed the informed consent form, and answered any questions the parent/caregiver had. In the school setting, the SLP was responsible for these steps. After signing the informed consent, the parent and PI or SLP reviewed the elicitation procedures. One participant's language samples were taken in his home where his parent elicited the language samples. Two sets of language samples were recorded at the participants' school where the SLP elicited the sample. During the session, the parent or SLP collected both conversation and narrative samples; the order of sample context was counterbalanced across the participants. In order to remain consistent with the comparison sample, the elicitation protocol used to collect

samples in the SALT database were kept consistent for the children in the present study. Each language sample was digitally recorded with a high quality audio recorder.

Conversation Sample. The parent or SLP was instructed to engage the child in a discussion regarding his/her classroom activities, holidays, family activities, or family events (see appendix E for the protocol). A list of these topics and sample questions were given to the parent or SLP prior to the recording. The child was asked to talk to their parent or SLP as they typically would. A 50 utterance language sample, lasting between 10 and 15 minutes was obtained.

Narrative Sample. The parent or SLP read a script that corresponded to a wordless picture book. Then, the child was instructed to tell their parent or SLP the same story while using the book and pictures as cues (see appendix F for the protocol). Since all children were 6 years old, they retold the story *Pookins Gets Her Way* (Lester, 1987). This is the same story used in the SALT database for the respective age.

Considerations and Modifications When Working With Children with ASD. Since many children with autism have unique behavioral and pragmatic profiles, modifications were made to ensure their success with the tasks in this study. Some behavioral considerations consistent with autism include the risk for ADHD or hyperactivity/impulsivity, rigidity, restricted and repetitive interests, insistence on routine/predictability, and aggressive or self-stimulatory movements due to seeking sensory input or output (Attwood, 2007; Fein, Dixon, Paul, & Levin, 2005; Goldstein, Johnson, & Minshew, 2001; Scarpa, White, & Attwood, 2013; Strum, Fernell, & Gillberg, 2004). In order to address these potential behaviors, the child was able to move around during the conversational sample without leaving the room. The parent and SLP were instructed that the samples should take place in a quiet room that has limited distractions. If the child was

off topic or task, he or she was redirected to the current conversation or task. The child was allowed to take as long as they needed to complete the samples. Since this was a new situation and outside of the child's regular routine, the parent or SLP was asked to prepare the child in advance of what would happen during the sample. This also was the reasoning for having the parent or SLP elicit both samples, to ensure that the tasks did not cause the child anxiety or to shut down and not talk (Scarpa et al., 2013).

Children with autism also have cognitive differences that needed to be accounted for. These cognitive considerations include executive functioning tasks, including difficulty planning, problem solving, organizing, and poor time management. Children with autism also interpret language literally (Scarpa et al., 2013). To ensure that these factors were taken into consideration, modifications included clear, concise directions that were repeated at the child's request, a visual copy of the directions, and a very structured environment (Scarpa et al., 2013). To ensure that the child was comfortable and could complete the tasks, the child was allowed to take breaks at their request and was reinforced for appropriate behaviors (Scarpa, et al., 2013). A copy of the elicitation directions for the parent or SLP are located in appendix D.

During this study, no modifications needed to be made for Dan or Nathan. This could have been because they were at school which is a more controlled environment than their own home. Alex, whose language samples were completed in his home required a few modifications to complete the language samples. He was very upset upon my arrival because he was expecting an ABA therapist. It took the ABA therapist that was currently with him twenty minutes to help him calm down. Once he was calm, his mother explained why I was there and the directions of the task. He was compliant with the language sample elicitations, but required a few redirections when he began to get agitated. He did not require breaks to be successful, but clear, concise directions were beneficial to gain compliance.

Transcription and Coding.

All samples were orthographically transcribed and coded according to SALT rules (Miller & Igelsias, 2013). Communication units (C-units) were used to segment utterances. A C-unit consists of an independent clause and all associated dependent clauses. The transcripts began with the child's first and last spoken utterance. Bound morphemes, reduplications and reformulations (i.e., mazes), word-level errors, and utterance-level errors were coded.

Measures. As children age, syntactic complexity, semantic diversity, and verbal productivity should increase and provide valid information on the child's developmental level (Retherford, 2007; Westerveld, 2004). In addition, measures from language samples can provide more in-depth description of discourse organization skills at the macrostructure level. Analysis of children's narrative production provides information on the child's ability to integrate memory processes, knowledge of story structure, and social and linguistic understanding to produce a cohesive narrative (Loveland et al., 1990; Westerveld & Gillon, 2010). Analysis of conversation samples provides information on discourse organization, such as formulating ideas, using appropriate vocabulary, maintaining or appropriately shifting topic, gaging the listener's comprehension, and reformulating if there is a communication breakdown (Heilmann et al., 2010). When compared to normative data, these linguistic behaviors can assist in synthesis for developing intervention goals and objectives (Retherford, 2007).

At the microstructural level, each sample was coded for vocabulary by documenting the number or different words (NDW). NDW was calculated by tallying the number of unique word roots produced within the sample within the first 50 utterances. Grammar and syntax were measured by calculating the mean length of utterance in morphemes (MLU-M). MLU-M was calculated by summing the total number of morphemes (both free and bound) in each utterance

and dividing by the total number of utterances. Utterance or syntactic errors and dropped morphemes were also calculated to further document the participants' grammatical and syntactic skills. Finally, to document the children's verbal fluency, the percentage of maze words produced that were reduplications or reformulations (i.e., mazes) were measured by dividing the total number of maze words by the total number of words produced in the sample.

The narrative language samples were coded for macrostructure using the Narrative Scoring Scheme (NSS; Heilmann et al., 2010). The NSS is a rubric that is used to evaluate the children's ability to effectively organize their narrative productions. Each narrative sample was evaluated for the quality of the following seven characteristics of well-formed narratives: introduction, character development, mental states, referencing, conflict/resolution, cohesion, and conclusion. Each section of the NSS was rated using a five-point rating scale, where a score of 5 is proficient, 3 emerging or inconsistent, 1 for immature of minimal use, and 2 and 4 are intermediate use. A score of 0 is given for poor performance or errors including telling a different story, engaging the examiner in conversation, failure or refusal to complete the task, abandoned utterances, unintelligibility, or imitation. These scores are provided for individual narrative parts and combined to achieve a composite score, with scores ranging from 0 - 35. A copy of these guidelines and the rubric used to evaluate each narrative are located in Appendix G.

To document the participants' discourse organization skills with the conversational samples, the samples were coded for contingent responses based on the study by Tager-Flusberg and Anderson (1991), which was adapted from Bloom, Rocissano & Hood (1976). In their study, Tager-Flusberg and Anderson found that children with autism were most different from typically developing children and children with Down syndrome in areas of topic maintenance (e.g., expansions and other categories that are used to add new information). They

found that although young, high-functioning children with autism did not appear much different in their discourse ability when compared to typically developing peers and peers with Down syndrome, as these children got older, they fell behind their peers in areas of contingent discourse. Therefore, this study focused on contingency of responses to the conversation partner's previous utterance, and categorization of the type of response using the following criteria (see Appendix H for coding rules).

Contingent: The child's utterance continues the topic of the caregiver's previous utterance.

Non-contingent: The child's utterance is unrelated to the caregiver's previous utterance.

To document contingency, the percentage of contingent utterances (in relation to the number of non-contingent utterances) were calculated. Next, all contingent responses were coded to determine how the child maintained the ongoing topic of discourse:

Expansion: The child adds information to the topic and content of the caregiver's previous utterance.

Self-expansion: The child adds information to the topic and content of his or her own previous utterance.

Expatiation: The child adds information to the topic of the caregiver's pervious utterance and introduces a new related topic.

Children's use of the four types of contingent utterances will be tallied and used as a follow-up description children's use of contingent discourse**.**

Transcription Accuracy. Transcripts were re-transcribed and recoded by the major advisor. The transcripts were analyzed for percent agreement for morphemes, utterance

segmentation, and mazes. High agreement was observed at each level of analysis for the six transcripts. Agreement for morphemes was 97% (1,179/1,211), agreement for utterances was 96% (390/405), and agreement for mazes was 90% (27/30). These results are consistent with the literature (Heilmann et al., 2008).

Chapter 3: Results

Matching Transcripts to the SALT Database

Each participant was matched to a group of children from the SALT database. Since all participants were 6 years old, the age range of 6;0 to 7;0 was used for both conversation and narrative analyses. For each conversation sample, participants were matched to typically developing peers based on the greatest number of complete and intelligible utterances produced in their sample. Alex was matched at 62 utterances, Dan was matched at 63 utterances, and Nathan was matched at 72 utterances. For each narrative sample, children were compared to 6;0-7;0 year olds who read the story *Frog Where Are You?* by Mercer Mayer due to the fact that it covers a younger age range and the grade level of the participants. See Table 2 for a full description of the number of samples used in the comparisons, ratio of males to females, and age range.

Table 2: Comparison to SALT Database

SALT Comparisons				
		N	*M/F*	*Age*
Alex	Conversation	75	35/40	6;0-7;0
	Narrative	62	25/37	6;0-7;0
Dan	Conversation	72	33/39	6;0-7;0
	Narrative	62	25/37	6;0-7;0
Nathan	Conversation	55	23/32	6;0-7;0
	Narrative	62	25/37	6;0-7;0

Microstrucutral Analysis

Alex. During his conversation, Alex discussed the Titanic while building a ship out of Legos. The results of Alex's conversational sample are summarized in Table 3 below. In each of the tables summarizing the microstructural measures, the average score and standard deviation generated from the comparison children in the SALT database, the child's language sample measure generated from his language sample, and the number of standard deviations that the participant was from the database average are provided. For ease of comparison across the standard deviation values, I ensured that all of the measures that were more impaired had a negative standard deviation and that the measures that were less deficient had positive standard deviations. This conversion was necessary for word errors, utterance errors, and mazes, as children producing fewer "errors" typically demonstrate less of a deficiency. After summarizing the results for each individual measure, I averaged the standard deviations across the five different microstructural measures to generate an overall standard deviation summarizing performance on the sample as a whole.

Table 3. Summary of Alex's *conversational* language measures compared to the SALT database.

	Database Mean (SD)	Alex	+/- Standard deviation
MLU	5.8 (1.4)	3.0	-2.0
NDW	135.4 (21.0)	75.0	-2.9
Word Errors	2.83 (2.5)	2	0.3*
Utterance Errors	1.0 (1.2)	12.0	-9.0**
Mazes	16.9 (5.9)	5.0	1.7*
Overall SD			**-2.4**

* ≥ 1 SD above the Overall SD (relative strengths)
** ≥ 1 SD below the Overall SD (relative weaknesses)

Overall, Alex's conversational language measures were well below his age-matched peers. I next reviewed each of the microstructural measures to determine if there were any relative strengths and/or relative weaknesses within this sample of language. For this study, I

have operationalized a relative strength/weakness as any measure that is at least one standard deviation above or below the overall standard deviation for the sample. He had very few word errors during conversation, which suggested that Alex's word production was a relative strength. Furthermore, he used substantially fewer mazes when compared to his age-matched peers, which suggested that his speaking fluency and formulation was a relative strength. Utterance-level errors, which were 9 standard deviations below his peers, was a relative weakness. While most typically developing six year-old children produce one syntactically incorrect utterance for every 62 utterances, Alex had 12 utterances that were produced incorrectly.

The microstructural measures from Alex's narrative sample are summarized in Table 4. Again, Alex demonstrated a relative strength in word-level errors, meaning that the number of words that he produced incorrectly was relatively comparable to his age-matched peers. He also demonstrated a relative strength in his limited use of mazes. Alex's MLU was a substantial relative weakness.

Table 4. Summary of Alex's *narrative* language measures compared to the SALT database.

	Database Mean (SD)	Alex	+/- Standard deviation
MLU	8.2 (0.9)	2.7	-6.2**
NDW	99.4 (18.7)	59.0	-2.2
Word Errors	3.3 (2.7)	5.0	-0.7*
Utterance Errors	0.8 (1.2)	4.0	-2.7
Mazes	17.4 (13.7)	1.0	1.4*
Overall SD			**-2.1**

* ≥ 1 SD above the Overall SD (relative strengths)
** ≥ 1 SD below the Overall SD (relative weaknesses)

Dan. In Dan's conversational sample, he answered questions from his SLP about current events and school activities. The results of Dan's conversational sample are summarized in Table 5. Overall, his conversational language skills were below those of his peers. Relative

strengths for Dan included a low number of word level errors and mazes. When compared to his typically developing peers, Dan had substantially more utterance-level errors, suggesting a relative weakness in producing syntactically correct utterances. In addition, Dan had a relatively low NDW value, indicating lexical diversity was a relative weakness.

Table 5. Summary of Dan's *conversational* language measures compared to the SALT database.

	Database Mean (SD)	Dan	+/- Standard deviation
MLU	5.2 (1.2)	1.8	-2.8
NDW	136.0 (20.3)	62.0	-3.6**
Word Errors	2.8 (2.5)	2.0	0.3*
Utterance Errors	2.9 (2.5)	12.0	-9.0**
Mazes	20.9 (8.8)	2.0	2.2*
Overall SD			**-2.6**

* ≥ 1 SD above the Overall SD (relative strengths)
** ≥ 1 SD below the Overall SD (relative weaknesses)

Table 6 summarizes the microstructural results from Dan's narrative sample. Dan's overall narrative language ability was significantly below that of his peers. Relative strengths included word-level errors and mazes. His relative weaknesses included MLU and utterance-level errors.

Table 6. Summary of Dan's *narrative* language measures compared to the SALT database.

	Database Mean (SD)	Dan	+/- Standard deviation
MLU	7.4 (0.8)	1.9	-6.9**
NDW	99.4 (18.7)	41.0	-3.1
Word Errors	3.3 (2.7)	1.0	0.9*
Utterance Errors	0.8 (1.2)	6.0	-4.4**
Mazes	17.4 (13.7)	1.0	1.2*
Overall SD			**-2.5**

* ≥ 1 SD above the Overall SD (relative strengths)
** ≥ 1 SD below the Overall SD (relative weaknesses)

Nathan. Nathan attended a K5 classroom at the charter school. He also discussed current events and school activities with his SLP during his conversation sample. Table 7

summarizes the results from his conversational sample. Nathan demonstrated a relative strength in word-level errors and mazes. His relative weakness within the conversational sample was with utterance-level errors.

Table 7. Summary of Nathan's *conversational* language measures compared to the SALT database.

	Database Mean (SD)	Nathan	+/- Standard deviation
MLU	5.2 (1.3)	2.7	-2.0
NDW	140.4 (23.5)	78.0	-2.7
Word Errors	3.4 (2.9)	4.0	-0.2*
Utterance Errors	1.0 (1.3)	14.0	-9.9**
Mazes	22.5 (10.0)	11.0	1.2*
Overall SD			**-2.7**

* ≥ 1 SD above the Overall SD (relative strengths)
** ≥ 1 SD below the Overall SD (relative weaknesses)

Table 8 summarizes Nathan's narrative language measures. He demonstrated a relative strength with NDW and mazes. Relative weaknesses included utterance-level errors and MLU.

Table 8. Summary of Nathan's *narrative* language measures compared to the SALT database.

	Database Mean (SD)	Nathan's narrative	+/- Standard deviation
MLU	7.4 (0.8)	4.4	-3.8**
NDW	99.4 (18.7)	107.0	0.4*
Word Errors	3.3 (2.7)	11.0	-2.9
Utterance Errors	0.8 (1.2)	11.0	-8.7**
Mazes	17.4 (13.7)	7.0	0.8*
Overall SD			-2.8

* ≥ 1 SD above the Overall SD (relative strengths)
** ≥ 1 SD below the Overall SD (relative weaknesses)

Comparisons Across Participants. Table 9 summarizes the results from the microstructural analyses for all of the children's conversational and narrative samples. As seen in the first two columns of Table 9, measures from each child's conversational and narrative language samples were, on average, more than two standard deviations below their peers.

Furthermore, there were modest differences in the average standard deviations when comparing across the conversational and narrative elicitation contexts. Each child also demonstrated relative strengths in lexical accuracy and verbal fluency across both the conversation and narrative samples. Conversely, their relative weaknesses surrounded the complexity and accuracy of their utterances. Within the conversational samples, each of the children demonstrated relative difficulty in producing syntactically accurate utterances (as reflected in the high number of utterance errors). Conversely, when producing narrative samples, the children produced utterances with relatively simple grammar and syntax (as reflected in very low MLU values compared to their peers).

Table 9. Summary of participants' profiles based on microstructural measures

	Average Standard Deviations from Comparison Group		Relative Strengths		Relative Weaknesses	
	Conversation	Narrative	Conversation	Narrative	Conversation	Narrative
Alex	-2.4	-2.1	Word errors & mazes	Word errors & mazes	Utterance errors	MLU
Dan	-2.6	-2.5	Word errors & mazes	Word errors & mazes	Utterance errors & NDW	Utterance errors & MLU
Nathan	-2.7	-2.8	Word errors & mazes	NDW & mazes	Utterance errors	Utterance errors & MLU

Macrostructural Analysis

After completing the microstructural analyses on each of the transcripts, I completed a macrostructural analysis for both the conversational and narrative samples.

Macrostructural Analysis of Conversational Samples. The coding scheme developed by Tager-Flusberg and Anderson (1991) was applied to each of the conversational samples. Each

utterance was coded as either being contingent or non-contingent to the preceding utterance; results are summarized in Table 10 below. The samples from the SALT database were not coded using this scheme, so no comparisons to the database were made. Alex's sample was fairly evenly split between contingent and non-contingent utterances, while Dan had slightly more contingent than non-contingent utterances. Nathan had substantially more contingent utterances compared to non-contingent utterances, demonstrating that he had the most success staying on topic.

Table 10. Percentage contingent and non-contingent utterances across the three participants.

	% Contingent Utterances	% Non-contingent Utterances
Alex	47.5%	52.5%
Dan	59.6%	40.4%
Nathan	87.9%	12.1%

Each of the contingent utterances was further coded to describe the type of contingency that was used as defined by Tager-Flusberg and Anderson (1991), which is summarized in Table 11. The majority of Alex's contingent utterances were self-expansions and answers to wh-questions. A smaller percentage of his contingencies were expansions, imitations, and expatiations. He had less of a back and forth conversation with his mother compared to the other participants. Though only 62 utterances were utilized during this sample, he also had many more utterances to choose from due to the fact that he was passionate about the topic he discussed. The majority of Dan's contingent utterances were imitations and answers to wh-questions, with substantially fewer expansions, self-expansions, and expatiations. Nathan's contingent responses were overwhelmingly answers to wh-questions, along with a smaller number of expansions, self-expansions and expatiations.

Table 11. Description of types of contingent utterances across the three participants.

	Expansion	Self-expansion	Expatiation	Imitation	Answer to Wh-Question
Alex	17.9%	39.0%	3.6%	14.3%	25.0%
Dan	0.0%	3.0%	9.1%	33.3%	54.5%
Nathan	3.0%	9.4%	18.2%	0.0%	69.7%

Macrostructural Analysis of Narrative Samples. The NSS was applied to each of the narrative samples (see Table 12 for a summary). Alex and Dan each received some credit for the "Introduction" section of the rubric for stating that Pookins likes to throw apples. Nathan received partial credit for the "Ending" section of the rubric for stating "The End" when he was finished narrating the story. Each participant was at the floor of the rating scale for every other section of the NSS. Throughout the narrative productions, each participant provided simple descriptions of the pictures on each page instead of telling a coherent narrative with a series of episodes driving the central plot.

Table 12. Summary of NSS scores for each participant and from the SALT database.

	Alex	Dan	Nathan	SALT Database Mean (SD)
Introduction	3	3	1	2.7 (0.8)
Character Development	1	1	1	2.9 (0.5)
Mental States	1	1	1	2.2 (0.8)
Referencing	1	1	1	3.2 (0.8)
Conflict Resolution	1	1	1	3.0 (0.6)
Cohesion	1	1	1	3.1 (0.7)
Ending	1	1	3	2.9 (0.9)
Total	9	9	9	19.8 (2.7)

Chapter 4: Discussion

Through this study, it can be confirmed that LSA did indeed confirm the presence of a language impairment based on the fact that both conversational and narrative language samples for all participants were greater than two standard deviations below the mean. These results are consistent with literature that states that children with autism have deficits in all domains of language including form, content, and use (Eigsti, Bennetto, & Dadlani, 2007; Gerenser, 2009; Landa & Goldbert, 2005; Lee, Hobson, & Chiat, 1994; Perovic, Modyanova, & Wexler, 2011; Philofsky, Fidler, & Hepburn, 2007; Tager-Flusberg, 2000; 2006; 2007). As previously stated, research has shown that children with autism typically drop grammatical morphemes resulting in shorter MLU-M, have less complex syntax, and smaller vocabularies than their typically developing peers (Eigsti et al., 2007; Gerenser, 2009; Tager-Flusberg, 2000;2007). Children with autism also have difficulty using and interpreting nonverbal language, understanding abstract language and organizing discourse for both conversation and narratives (Bauminger-Zviely, Karin, Kimhi, & Agam-Ben-Artzi, 2014; Capps, Kehres, & Sigman, 1998; Ganos, Ogrzal, Schnitzler, & Münchau, 2012; Gerenser, 2009; Loveland et al., 1990; Philofsky et al., 2007; Tager-Flusberg, 2000; 2007). Furthermore, LSA was an effective method for describing the multiple dimensions of language strengths and weaknesses in the current study (Paul & Norbury, 2012; Retherford, 2007).

Microstrucural Results

We know that children with autism have lower language levels than their typically developing peers, on average greater than two standard deviations below the mean. Next, I will go into detail about which aspects of the samples were affected.

Conversational Samples. All participants had relative strengths in the areas of word level errors and mazes, meaning that they produced less word level errors and mazes. This is

consistent with research by Wagner, Nettelbaldt, Sahlén, and Niholm (2000) stating than conversational language sampling produces more fluent utterances than narrative language sampling. Less mazes could have been due to the fact that the participants had fewer NDW and shorter MLU-M than their typically developing peers resulting in more simple sentence structure, thus allowing them to use a more simple organization to their discourse, consistent with findings by Eigsti et al., 2007 and Gerenser, 2009. Though participants used few word level errors, the errors present could have been due to a linear and ridged use of grammatical rules, such as overgeneralization of plural –s as seen in the conversation samples of Alex and Dan (Perovic et al., 2011).

Relative weaknesses in conversation were utterance level errors, as consistent with previous literature by Gerenser, 2009. These findings are inconsistent with literature from Eigsti et al.(2007), which stated that though children with autism used a more simple sentence structure, they did not make syntactic errors. In the participants' samples, many of the children used improper word order and multiple word level errors that created the entire utterance to be incorrect. Examples are as follows, "All over the wet." or "Pookins in the standing." These differences could be based on the classification of word versus utterance level errors. For the purposes of this study, more than one word level error was documented as an utterance level error due to the fact that the entire utterance was affected by the errors. Similar results were noticed in the narrative samples. However, had each word level error been coded separately, word level errors may have been more present and utterance level errors less present.

Narrative Samples. Relative strengths across participants in the narrative samples also included word level errors and mazes. This is inconsistent with research by Wagner, Nettelbaldt, Sahlén, and Niholm (2000) stating that narrative language sampling typically elicits more mazes due to increased complexity of discourse organization. Nathan's results were consistent with

research by Westerveld, Gillion, and Miller (2004) which stated that children typically produced more words and longer sentences in narratives than in conversation as demonstrated by the fact that NDW was a relative strength for Nathan. The fact that Dan and Alex produced a decreased NDW and MLU-M are possibly due to the fact that narrative language sampling required higher language processing demands than conversation (Wagner et al., 2000).This idea also supports the relative weaknesses in the narrative samples which included utterance level errors for Dan and Nathan and MLU-M for all participants.

Macrostructural Results

Conversational Samples. Alex and Dan had relatively the same amount of contingent responses as non-contingent responses whereas Nathan produced more contingent responses than non-contingent responses. Though Nathan produced more contingent responses, only 87.9% of his responses were contingent proving that these results are consistent with the results of literature by Tager-Flusberg and Anderson (2001) that stated that children with autism produce less contingent responses than their typically developing and Down syndrome peers. Though specific data were unavailable on typically developing peers in this study as it was taken from a previous study by Bloom, Rocissano & Hood (1976), children with autism produced 38.1% contingent responses and 20.1% non-contingent responses. Children with Down syndrome produced 48.5% contingent responses and 14.6% non-contingent responses. The other percentage of utterances were imitations with children with autism producing 16.1% and children with Down syndrome producing 14.9%. Also consistent with research by Tager-Flusberg and Anderson (2001), all participants added less to the topic which is demonstrated by expansions representing only 17.9%, 0.0%, and 3.0% , self-expansions representing 39.0%, 3.0%, and 9.4%, and expatiations representing 3.6%, 9.1%, and 18.2% of Alex, Dan, and Nathan's conversation samples respectively. Though the high number of self-expansions represented the

majority of Alex's contingent responses, these responses were not directed toward his communication partner. The high number of self-expansions could also possibly be due to the fact that his mother did not continue to question him and simply commented on the ship he was building out of Legos. The majority of contingent responses provided by Dan and Nathan were answers to wh-questions which could have been due to the fact that their conversation samples were more of a question and answer style conversation with their SLP. Alex and Dan also had a high percentage of imitations in their conversation samples consistent with previous literature that states that children with autism have difficulty responding appropriately to conversation and tend to use socially inappropriate comments, repeat the speaker, and over use stereotyped utterances, idiosyncratic language and neologisms, or give no response in an attempt to continue the conversation (Bauminger-Zviely et al., 2014; Capps et al., 1998; Philofsky et al., 2007; Tager-Flusberg, 1996; 2007). Stereotyped utterances or scripting, idiosyncratic language and neologisms were seen in the language samples of all participants. Though Alex participated in a conversation with his mother about the Titanic when she asked questions, the majority of his conversation sample was a script of what happened to the Titanic, resulting in a high percentage of self-expansions. Nathan also used many neologisms in his language sample when describing things he made with blocks. For example, he told his SLP that one of his friends made an 'up' with blocks. When asked what an 'up' meant, he said it meant it was good. Though this term did not make sense to his SLP or anyone who transcribed the language sample, it is likely that this term had significance to Nathan (Volden & Lord, 1991). Scripting and off-topic utterances were also noted in the participants' narrative samples, among other differences and deficits.

Role of the communication partner. It is important to consider the role the communication partner had on the child's elicited responses. As mentioned previously, Dan and

Nathan's SLP had a question and answer style conversation with them which was similar to the type of conversation sample elicited by age-matched peers from the SALT database. Though they still did not add to the topic of conversation or introduce a new topic of conversation, their responses were truly contingent since they were answers to questions. Alex's mother played a more passive role in the conversation, allowing him to discuss a topic of his interest while he played. In this sense, Alex's utterances did not necessarily need to be directed toward his mother to seem as if they were of the same topic, or contingent. Alex was scripting a conversation with himself about the Titanic and was not forced to interact with his communication partner the way Dan and Nathan were.

Narrative Samples. As previously stated, all participants were at floor when rated using the NSS. Alex and Dan both received three points for an introduction by stating that Pookins liked to throw apples. Nathan received three points for a conclusion by stating, "the end." All participants lacked cohesion in their narrative and described and acted out (Alex) the pictures in the book rather than retelling the story. These results were consistent with research by Tager-Flusberg (1996), who found that children with pragmatic difficulties had poor story organization, fewer story episodes, and poor story grammar. As seen with the participants in this study, their narratives lacked these qualities all together. This is likely due to the fact that children with autism lack the ability to inference and draw conclusions based on the characters' behavior, emotions, or events in the story (Baron-Cohen et al., 1986; Diehl et al., 2006; Norbury and Bishop, 2002). The narratives produced by the participants lacked any emotional state but was rather a series of labeling actions and objects in the pictures. This is likely due to the fact that children with autism have difficulty interpreting and using nonverbal language such as facial expressions and body language (Bauminger-Zviely, Karin, Kimhi, & Agam-Ben-Artzi, 2014; Capps, Kehres, & Sigman, 1998; Ganos, Ogrzal, Schnitzler, & Münchau, 2012; Gerenser, 2009; Loveland

et al., 1990; Philofsky et al., 2007; Tager-Flusberg, 2000; 2007). This was a great detriment in terms of the participants' abilities to retell a story, considering many events in a story are driven by a character's emotions which result in actions or reactions to an event.

Language Profiles

Though there was variability in performance among participants, there were indeed general trends in terms of the strengths and weaknesses observed. Overall strengths in both conversation and narrative samples included a reduced amount of mazes and word level errors. Weaknesses were observed in grammar and syntax. Context did however affect how these strengths and weaknesses presented themselves.

Comparing Conversation and Narrative Profiles. It was originally predicted that the participants would perform better in the story retell task than in conversation due to the fact that the narrative was more structured and provided the participants guidelines as to how they were to respond. However, the conversation samples with the participants were also relatively structured due to the fact that their contingent responses were primarily responses to wh-questions from the examiner, or in Alex's case, self-expansions which allowed him to script and discuss a topic of passion without much interaction with his mother. In conversation samples, weaknesses in grammar and syntax presented themselves in a high amount of utterance level errors as participants struggled to use correct word order in sentences. In the narrative samples, deficits in grammar and syntax presented themselves in utterance level errors and reduced MLU-M. This indicates that the participants who had a lower MLU-M in their narrative samples most likely used more simple sentence structure. In research on narrative language samples produced by typically developing children, more words, longer sentences, more word level errors, and more mazes were elicited due to the higher demands of planning, increased number

of forced productions, and longer units of speech than in conversation (Wagner et al., 2000; Westerveld et al.,2004). Participants in this study may have performed poorer in story retell tasks because they were unable to use higher level discourse organization and produce utterances with increased complexity simultaneously. Due to these increased planning demands to generate a narrative, participants may have reduced the complexity of their utterances and MLU-M to attempt to attend to the discourse organization demands. In other words, it is possible that due to their linguistic capacity, they performed better in conversation because this context allowed them to focus less attention on planning and organizing their thoughts and more on how they used language to respond. The participants in this study may have been able to use their higher level language skills in conversation rather than in narratives due to the fact that they had more capacity to devote to responses rather than planning and organizing discourse.

Though a low level of mazes was considered a strength in this study, it could also be indicative of low language levels. An increased number of mazes may have shown that the child is capable of a higher level of language, but had trouble getting that language out fluently. Since all participants had a low number of mazes in both conversation and narrative language samples, it could be possible that they did not use revisions or reduplications because they were displaying the only level of language they were capable of. Thus, their linguistic capacity was utilized for discourse organization, so their utterances were shorter, simpler, and also more fluent.

Grade-Level Effects on Language Profiles. Another important consideration when describing the children's language profiles is the consideration of cognitive abilities. Since no formal cognitive measures were utilize in this study, the child's grade-level was taken into consideration. Overall, Alex, who was in a K4 classroom, elicited a more immature style of

conversation and narrative samples. This was demonstrated by the fact that his conversation sample was more of a play-based language sample than back and forth conversation. In his narrative, he also acted out pictures in the book as a means of describing them instead of verbally describing the pictures. Though Nathan, a K5 student, had higher language scores than the other participants, his discourse skills were also slightly more immature than Dan's. Nathan said, "Huh?" or "Hmm?" after each of the examiner's utterances. He also went off topic and began scripting from a movie for about 3 minutes during his narrative sample. Dan, being in first grade, had the highest level of language skills. Though not all of his responses were contingent, the non-contingent responses had more to do with inaccurate responses to questions than completely changing the topic. He also remained more on topic during his narrative sample and had the best attempt at cohesion and describing mental/physical states than the other two participants. This demonstrates that cognitive ability also plays an important factor in a child's language profile.

Limitations

The results of this study are not able to be generalized to a broader category of children with autism due to the limited number of participants. Results would have been more conclusive, had there been at least 20 participants to compare results among. Choice of recruitment strategies may have accounted for this. Another limitation of this study is that the participants read a book that was advanced for their age group. To make a better comparison to children their age, their narrative samples were compared to typically developing peers who read a different book. The story *Pookins Gets Her Way* was chosen due to the age range that was originally selected for the study. Original recruitment attempts were made for participants ranging from 6;0 to 8;0 years old. In the SALT database, the largest comparison group who read the book *Pookins Gets Her Way* was around 7;0 to 7;11. Since this age range is in the middle of

our desired range of participants, it was decided that all participants would read this book for a better comparison across participants. Had it been anticipated that all participants would be 6;0 to 6;11, the book *Frog Where Are You?* would have been chosen as the majority of children in that age range in the SALT database read this book and it was more at the children's developmental level. An additional limitation is a result of the macrostructural analysis of the conversation samples. Though percentages were generated for contingent versus non-contingent and types of contingent responses, it would have been beneficial and made results more justifiable had there been a group of age-matched typically developing peers as a comparison, generating suggestions for future research.

Future Research

Further research is required to generalize the results of this study. A study with similar methods, but more participants would assist in providing more conclusive results. Adding typically developing, age-matched peers as participants would also provide a further description of behavioral modifications required for children with autism. It would also provide normative values to compare macrostructural results of contingent versus non-contingent and types of contingent responses. A study with language-matched typically developing peers would also allow for a more descriptive comparison of language profiles. If children with autism produce similar profiles to typically developing peers, it could be inferred that these children are language delayed. If they are different, we could infer that the language of children with autism is qualitatively different. An additional study would also be useful to further document properties of samples collected via parent compared to clinician and home compared to school since both elicitation methods were utilized in this study. The results of this study would be useful in determining if there are differences in elicitation methods of the language samples when the examiner is trained or not. It would also be useful in determining what effect the level

of comfort with the communication partner has on the child and how it impacts the language samples they produce. Finally, this future study would be helpful in determining what affect a more structured environment, like school or a more comfortable but less structured environment, like home have on the level of language elicited.

Conclusion

The results of this study provide preliminary data describing two language sampling procedures used for children with autism. The three participants with an autism spectrum disorder were different from their typically developing peers in all domains of language. In their conversation samples, they were more fluent and produced few word level errors, yet they produced a high level of syntactic errors. They responded appropriately to wh-questions from their communication partner, but also used scripting, neologisms, idiosynchratic language and off-topic responses during conversation. They made little attempt to continue the conversation or provide new topics of conversation. During their narrative samples, the participants also used less mazes and word level errors, but use more simple syntax as represented by shorter MLU-M. This is suggested to be due the fact that since children with autism struggle with all domains of language, they have a limited linguistic capacity. Conversation samples elicited the highest level of language because capacity was not compromised for higher level discourse organization as required in narrative tasks.

Clinical Implications

This study has provided further evidence for LSA as an effective evidence-based practice to be utilized for diagnostic purposes for children with autism. Since conversation and narratives are both important social and academic skills, these contexts are necessary to provide a complete picture of a child's language deficits. Conversation is an effective way to elicit fluent,

higher level utterances from children with autism. To get an idea of their higher level discourse organization skills, narrative language sampling is an effective method. It is important to remember that each child is an individual and results received with one child may not be generalized to a child with similar language differences or deficits.

References

Allen, M. L., Haywood, S., Rajendran, G., & Branigan, H. (2011). Evidence for syntactic alignment in children with autism. *Developmental science*, *14*(3), 540-548.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: American Psychiatric Publishing.

American Speech Language Hearing Association. (2014). *Speech sound disorders-articulation and phonology: Incidence and prevalence*. Retrieved August 2, 2014 from http://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935321&section=Incidence_and_Prevalence.

Åsberg, J. (2010). Patterns of language and discourse comprehension skills in school-aged children with autism spectrum disorders. *Scandinavian Journal of Psychology*, *51*(6), 534-539.

Attwood, T. (2007). *The complete guide to Asperger's syndrome.* London: Jessica Kingsley.

Baron-Cohen, S., Leslie, A. M., & Frith, U. (1986). Mechanical, behavioural and intentional understanding of picture stories in autistic children. *British Journal of Developmental Psychology*, *4*(2), 113-125.

Bauminger-Zviely, N., Karin, E., Kimhi, Y., & Agam-Ben-Artzi, G. (2014). Spontaneous peer conversation in preschoolers with high-functioning autism spectrum disorder versus typical development. *Journal of Child Psychology and Psychiatry*, *55*(4), 363-373.

Bishop, D. V. M., Chan, J., Adams, C., Hartley, J., & Weir, F. (2000). Conversational responsiveness in specific language impairment: Evidence of disproportionate pragmatic difficulties in a subset of children. *Development and Psychopathology*, *12*(02), 177-199.

Bloom, L., Rocissano, L., & Hood, L. (1976). Adult-child discourse: developmental interaction between information processing and linguistic knowledge. *Cognitive Psychology, **8,** 521-552.*

Bloom, L., & Lahey, M. (1978). Language development and language disorders.

Botting, N. (2002). Narrative as a tool for the assessment of linguistic and pragmatic impairments. *Child Language Teaching and Therapy*, *18*(1), 1-21.

Capps, L., Kehres, J., & Sigman, M. (1998). Conversational abilities among children with autism and children with developmental delays. *Autism*, *2*(4), 325-344.

Capps, L., Losh, M., & Thurber, C. (2000). "The frog ate the bug and made his mouth sad": Narrative competence in children with autism. *Journal of Abnormal Child Psychology*, *28*(2), 193-204.

Centers for Disease Control and Prevention. (March 20, 2014). *Facts about asd.* Retrieved June 5, 2014 from http://www.cdc.gov/ncbddd/autism/facts.html.

Condouris, K., Meyer, E., & Tager-Flusberg, H. (2003). The relationship between standardized measures of language and measures of spontaneous speech in children with autism. *American Journal of Speech-Language Pathology*, *12*(3), 349-358.

Diehl, J. J., Bennetto, L., & Young, E. C. (2006). Story recall and narrative coherence of high-functioning children with autism spectrum disorders. *Journal of Abnormal Child Psychology*, *34*(1), 83-98.

Eigsti, I. M., Bennetto, L., & Dadlani, M. B. (2007). Beyond pragmatics: Morphosyntactic development in autism. *Journal of autism and developmental disorders*, *37*(6), 1007-1023.

Fein, D., Dixon, P., Paul, J., & Levin, H. (2005). Pervasive developmental disorder can evolve into ADHD: Case illistrations. *Jounal of Autism and Developmental Disorders, 35,* 525-534.

Ganos, C., Ogrzal, T., Schnitzler, A., & Münchau, A. (2012). The pathophysiology of echopraxia/echolalia: relevance to Gilles de la Tourette syndrome. *Movement Disorders. 27*(10): 1222–9.

Gerenser, J. (2009). Language disorders in children with autism. *Handbook of child language disorders*, 67-89.

Goldstein, G., Johnson, C., & Minshew, N. (2001). Attentional process in autism. *Journal of Autism and Developmental Disorders, 31,* 433-440.

Happé, F. G. (1994). An advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Developmental Disorders*,*24*(2), 129-154.

Heilmann, J. J., Miller, J. F., & Nockerts, A. (2010). Using language sample databases. *Language, Speech, and Hearing Services in Schools*, *41*(1), 84-95.

Jarrold, C., Boucher, J., & Russell, J. (1997). Language Profiles in Children with Autism Theoretical and Methodological Implications. *Autism*, *1*(1), 57-76.

Kelly, K. R., & Bailey, A. L. (2013). Dual Development of Conversational and Narrative Discourse: Mother and Child Interactions During Narrative Co-construction. *Merrill-Palmer Quarterly*, *59*(4), 426-460.

Kjelgaard, M. M., & Tager-Flusberg, H. (2001). An investigation of language impairment in autism: Implications for genetic subgroups. *Language and Cognitive Processes*, *16*(2-3), 287-308.

Landa, R. J., & Goldberg, M. C. (2005). Language, social, and executive functions in high functioning autism: A continuum of performance. *Journal of Autism and Developmental Disorders*, *35*(5), 557-573.

Lee, A., Hobson, R. P., & Chiat, S. (1994). I, you, me, and autism: An experimental study. *Journal of Autism and Developmental Disorders*, *24*(2), 155-176.

Lewis, F. M., Murdoch, B. E., & Woodyatt, G. C. (2007). Linguistic abilities in children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *1*(1), 85-100.

Loos, E.E., Anderson, S., Day, D.H., Jordan, P.C., & Wingate, J.D. (2003). What is phonology? *LinguaLinks Library.* (Version 5.0 on CD-ROM by SIL International). Retrieved August 2, 2014 from http://www-01.sil.org/linguistics/glossaryoflinguisticterms/WhatIsPhonology.htm.

Loucas, T., Charman, T., Pickles, A., Simonoff, E., Chandler, S., Meldrum, D., & Baird, G. (2008). Autistic symptomatology and language ability in autism spectrum disorder and specific language impairment. *Journal of Child Psychology and Psychiatry*, *49*(11), 1184-1192.

Loveland, K. A., McEvoy, R. E., Tunali, B., & Kelley, M. L. (1990). Narrative story telling in autism and Down's syndrome. *British Journal of Developmental Psychology*, *8*(1), 9-23.

Maser, J. D., Akiskal, H.S. (December 2002). Spectrum concepts in major mental disorders. *The Psychiatric Clinics of North America 25*(4): xi–xiii.

McCauley, R. J., & Swisher, L. (1984). Use and misuse of norm-referenced test in clinical assessment: a hypothetical case. *Journal of Speech and Hearing Disorders*, *49*(4), 338-348.

McCann, J., Peppé, S., Gibbon, F. E., O'Hare, A., & Rutherford, M. (2007). Prosody and its relationship to language in school-aged children with high-functioning autism. *International Journal of Language & Communication Disorders*, *42*(6), 682-702.

Miller, J. F. *Systematic Analysis of Language Transcripts Database.*

Norbury, C. F., & Bishop, D. V. (2002). Inferential processing and story recall in children with communication problems: a comparison of specific language impairment, pragmatic

language impairment and high-functioning autism. *International Journal of Language & Communication Disorders*, *37*(3), 227-251.

Owens, R. E. (2010). *Language disorders: A functional approach to assessment and intervention.* (5th ed.). Boston, MA: Pearson Education, Inc.

Paul, R., & Norbury, C. (2012). *Language disorders from infancy through adolescence: Listening, speaking, reading, writing, and communicating*. Elsevier Health Sciences.

Philofsky, A., Fidler, D. J., & Hepburn, S. (2007). Pragmatic language profiles of school-age children with autism spectrum disorders and Williams syndrome. *American Journal of Speech-Language Pathology*, *16*(4), 368-380.

Perovic, A., Modyanova, N., & Wexler, K. (2013). Comprehension of reflexive and personal pronouns in children with autism: A syntactic or pragmatic deficit?. *Applied Psycholinguistics*, *34*(04), 813-835.

Retherford, K. S. (2007). *Guide to analysis of language transcripts*. Austin, TX. PRO-ED Inc.

Rutter, M., Bailey, A. & Lord, C. (2003). *Social communication questionnaire.* Western Psychological Services Publishing.

Scarpa, A., White, S. W., & Attwood, T. (Eds.). (2013). *CBT for children and adolescents with high-functioning autism spectrum disorders*. Guilford Press. (pp 27-41).

Strum, H., Fernell, E., & Gillberg, C. (2004). Autism spectrum disorders in children with normal intellectual levels: Associated impairments and subgroups. *Developmental Medicine and Child Neurology, 46,* 444-447.

Tager-Flusberg, H. (1999). A psychological approach to understanding the social and language impairments in autism. *International Review of Psychiatry*,*11*(4), 325-334.

Tager-Flusberg, H. (2007). Atypical language development: Autism and other neurodevelopmental disorders. *Blackwell handbook of language development*, 432-453.

Tager-Flusberg, H. (1996). Brief report: Current theory and research on language and communication in autism. *Journal of Autism and Developmental Disorders*,*26*(2), 169-172.

Tager-Flusberg, H. (2006). Defining language phenotypes in autism. *Clinical Neuroscience Research*, *6*(3), 219-224.

Tager-Flusberg, H. (2000). Language and understanding minds: Connections in autism. *Understanding other minds: Perspectives from developmental cognitive neuroscience*, *2*, 124-149.

Tager-Flusberg, H., & Anderson, M. (1991). The development of contingent discourse ability in autistic children. *Journal of Child Psychology and Psychiatry*, *32*(7), 1123-1134.

Tager-Flusberg, H., Rogers, S., Cooper, J., Landa, R., Lord, C., Paul, R., ... & Yoder, P. (2009). Defining spoken language benchmarks and selecting measures of expressive language development for young children with autism spectrum disorders. *Journal of Speech, Language, and Hearing Research*,*52*(3), 643-652.

Tomblin, J. B., Morris, H. L., & Spriestersbach, D. C. (2000). *Diagnosis in speech-language pathology*. Singular Publishing Group.

Volden, J. (2004). Conversational repair in speakers with autism spectrum disorder. *International Journal of Language & Communication Disorders*, *39*(2), 171-189.

Volden, J., & Lord, C. (1991). Neologisms and idiosyncratic language in autistic speakers. *Journal o Autism and Developmental Disorders, 21*(2), 109-130.

Wagner, C. R., Nettelbladt, U., Sahlen, B., Nilholm, C. (2000). Conversation versus narration in pre-school children with language impairment. *International Journal of Language & Communication Disorders*, *35*(1), 83-93.

Westerveld, M. F., & Gillon, G. T. (2010). Profiling oral narrative ability in young school-aged children. *International Journal of Speech-Language Pathology*, *12*(3), 178-189.

Westerveld, M. F., Gillon, G. T., & Miller, J. F. (2004). Spoken language samples of New Zealand children in conversation and narration. *International Journal of Speech-Language Pathology*, *6*(4), 195-208.

Appendix A

Research Thesis Contact Log

Child's Name:_____

Child's Age:_____

Child's Grade Level in School:_____

Parent(s) Name(s):_____

_____

Phone Number:_____

Address_____

_____

- ☐ Child is receiving behavioral/ line therapy.
- ☐ Child is receiving behavioral/line therapy from _____.
  (Company)
- ☐ Child has received a diagnosis of an Autism Spectrum Disorder.
  My child's diagnosis was received on _____.
  (Date)
  My child's diagnosis was given by
  _____ at
  (Licensed Psychologist)
  _____
  _.
  (Facility/Clinic)
- ☐ Child has no reported hearing impairment
- ☐ Child has no reported comorbid conditions (Down syndrome, fragile x, etc.)
- ☐ Child has an IQ of at least 80
  I can provide documentation to verify. Yes / No

Speech/Language Screening

- ☐ Talks in sentences at least four words long (Must answer yes)
- ☐ People have trouble understanding much of what he says (Must answer no)
- ☐ Retells short stories such as Little Red Riding Hood; tells what happens in correct order and how the story ends (Must answer yes)
- ☐ Answers questions like "What do you do with a … cracker? … a hat? … a glass? (Must answer yes)
- ☐ Takes part in conversations, both talking and listening in turn (must answer yes)

- ☐ Speech is mostly two to three word phrases such as “me got ball” or “give dolly” (must answer no

For researcher’s use only:

Completed Sample Checklist

Child’s ID #: _____

- ☐ Child’s Verbal Consent
  - o Describe child’s consent:

- ☐ Contact Log

- ☐ Social Communication Questionnaire-2

- ☐ Conversational Language Sample

  Date: _____
  Given First or Second

- ☐ Narrative Language Sample

  Date: _____
  Given First or Second

Appendix B

School-Based Contact Log

Child's Name:_____

Child's Age:_____

School: _____

Child's Grade Level in School:_____

Speech-Language Pathologist:_____

Phone Number:_____

Check if Yes, leave blank if No.

- ☐ Child has received a diagnosis of an Autism Spectrum Disorder.

Language Screener

- ☐ Talks in sentences at least four words long (Must answer yes)
- ☐ People have trouble understanding much of what he says (Must answer no)
- ☐ Retells short stories such as Little Red Riding Hood; tells what happens in correct order and how the story ends (Must answer yes)
- ☐ Answers questions like "What do you do with a … cracker? … a hat? … a glass? (Must answer yes)
- ☐ Takes part in conversations, both talking and listening in turn (must answer yes)
- ☐ Speech is mostly two to three word phrases such as "me got ball" or "give dolly" (must answer no

For researcher's use only:

Child's ID #:_____

- ☐ Child's Verbal Consent
    - o Describe child's consent:

- ☐ Contact Log

- ☐ Social Communication Questionnaire-2

- ☐ Conversational Language Sample

Date: _____
Given First or Second

☐ Narrative Language Sample

Date: _____
Given First or Second

Appendix C

UNIVERSITY OF WISCONSIN – MILWAUKEE

PARENTAL CONSENT FOR CHILD TO PARTICIPATE IN RESEARCH

THIS CONSENT FORM HAS BEEN APPROVED BY THE IRB FOR A ONE YEAR PERIOD

1. General Information

Study title: Comparison of Conversation and Narrative Language Abilities in Verbally Fluent Children with Autism

Person in Charge of Study (Principal Investigator):

Corissa Kroenke, B.S.

Graduate student in Speech-Language Pathology

2. Study Description

Your child is being asked to participate in a research study. Your child's participation is completely voluntary. Your child does not have to participate if you do not want him/her to participate.

Study description:

Many children with autism have difficulty understanding and using appropriate language. It is important that speech-language pathologists have assessment tools to describe the unique language characteristics of clients with autism so that effective and efficient treatments can be provided to the child. To describe language strengths and weaknesses in children with language difficulties, they use a technique called language sample analysis, a clinical best-practice. This includes recording a short sample of the child's speech and analyzing it for age-appropriate language characteristics. Currently, there is limited research describing clinical best-practices for children with autism. The purpose of this study is to determine if children with autism use more appropriate language during conversations or while telling a story (narratives). Language ability will also be compared to typically developing children who are the same age. This study will

determine the language strengths and weaknesses in verbally fluent children with autism. The information gathered from this study will be used for diagnosis and planning for language treatment. Fifteen verbally fluent children with autism, aged 6-10, will be recruited from behavioral therapy companies, schools, and organizations in southeastern Wisconsin to participate in this study. Children will be observed and audio recorded having a conversation with their behavioral therapist, speech-language pathologist, or parent and retelling a story from a wordless picture book originally told by their therapist or parent. The study will take place in the participant's home or at their school. Travel to UWM is not required. This study includes a one-time commitment of 45 minutes to one hour, depending on the child's cooperation. Both language samples (conversation and narrative) will be analyzed for grammar and vocabulary errors. The conversation sample will be analyzed for appropriate responses to the communication partner's previous comment. The narrative samples will be analyzed for inclusion of critical parts of a story and story organization. The analysis will be completed using the Systematic Analysis of Language Transcripts (SALT) database.

3. Study Procedures

What will I be asked to do if I participate in the study?

If you agree to allow your child to participate, he or she will be asked to 1) have a conversation, 2) listen to a story, and 3) retell a story with their parent, speech-language pathologist, or behavioral therapist in their home or at school**.** As the parent/guardian, you will be asked to 4) fill out the Social Communication Questionnaire and 5) provide documentation of IQ and diagnosis of an autism spectrum disorder by a licensed psychologist or psychiatrist. The each language sample will take about 10-15 minutes and the original story telling will take about 5-10 minutes. It will take, 45 minutes to 1 hour for the child to perform all of the tasks, depending on their cooperation. The samples will be audio recorded so the sample can be transcribed and coded at a later date. If you refuse to allow for your child to be audio recorded, they may not participate in the study, as the recording will be utilized to code and analyze the data.

4. Risks and Minimizing Risks

What risks will my child face by participating in this study?

The only risks associated with this study are that the child may become upset during the recording of the language samples. Children with autism have behavioral and sensory characteristics that may cause them to become overwhelmed or need a break from the task. Due to difficulties communicating for social purposes, the child may also find the tasks

uncomfortable. To minimize the possibility of these risks, the child will be allowed to take breaks and behaviors will be managed by parent/behavioral staff. To minimize the discomfort of social interaction, the behavioral therapist, speech-language pathologist, or parent will participate in the conversation with the child because they are a more familiar communication partner. If the child is crying, screaming, hitting, kicking, or participating in self-injurious behaviors they will be redirected to the task. If they must be redirected more than four times, they will be excused from the study. Permanent, long-term, or severe physical, psychological, and social risks are not likely.

5. Benefits

Will my child receive any benefit from my participation in this study?

There are no benefits to you other than to help the researchers learn something new.

6. Study Costs and Compensation

Will I or my child be charged anything to participate in this study?

You will not be responsible for any of the costs from taking part in this research study.

Will I or my child be paid or given anything for being in the study?

You will not be paid for taking part in this research study.

7. Confidentiality

What happens to the information collected?

All information collected about your child during the course of this study will be kept confidential to the extent permitted by law. We may decide to present what we find to others, or publish our results in scientific journals or at scientific conferences. Information that identifies your child personally will not be released without your written permission. Only the PI, faculty advisor, and research assistants will have access to the information. However, the Institutional Review Board at UW-Milwaukee or appropriate federal agencies like the Office for Human Research Protections may review your child's study related records.

The participant's information will be recorded using a numerical code in place of the child's name.

The participant's information will be stored in a locked cabinet and on a password protected computer file.

When the study is complete, the data will be stored on a password protected file until all studies have been published.

8. Alternatives

Are there alternatives to participating in the study?

There are no known alternatives available to your child other than not taking part in this study.

9. Voluntary Participation and Withdrawal

What happens if I decide not to allow my child to be in this study?

Your child's participation in this study is entirely voluntary. You may choose not allow your child to take part in this study. If you decide to allow your child take part, you can change your mind later and withdraw him/her from the study. In addition, your child will also be asked whether he/she would like to participate in the research study after hearing/reading a description of the study. Your child must verbally agree to participate. Your child will be free to not answer any questions or withdraw at any time. Your and your child's decision will not change any present or future relationships with the University of Wisconsin Milwaukee.

If the subject withdraws early, we will destroy all information we collect about you and your child.

10. Questions

Who do I contact for questions about this study?

For more information about the study or the study procedures or treatments, or to withdraw your child from the study, contact:

Corissa Kroenke

University of Wisconsin-Milwaukee

College of Health Sciences

Department of Communication Sciences and Disorders

Enderis 8th floor

2400 E Hartford Ave.

Milwaukee, WI 53211

ckroenke@uwm.edu

(715) 304-8737

Who do I contact for questions about my child's rights or complaints about my child's treatment as a research subject?

The Institutional Review Board may ask your name, but all complaints are kept in confidence.

Institutional Review Board

Human Research Protection Program

Department of University Safety and Assurances

University of Wisconsin – Milwaukee

P.O. Box 413

Milwaukee, WI 53201

(414) 229-3173

11. Audio or Video recording or Photographs

Consent to Audio/Video/Photo Recording:

It is okay to audiotape my child while he/she is in this study and use my child's audiotaped data in the research.

Please initial: ____Yes ____No

12. Signatures

Parental/Guardian Consent:

I have read or had read to me this entire consent form, including the risks and benefits. I have had all of my questions answered. I understand that I may withdraw my child from the study at any time. I am not giving up any legal rights by signing this form. I am signing below to give consent for my child to participate in this study.

_____

Printed Name of Child Participant

_____

Printed Name of Parent/Guardian

_____ _____

Signature of Parent/Guardian Date

Principal Investigator (or Designee)

I have given this research subject information on the study that is accurate and sufficient for the subject to fully understand the nature, risks and benefits of the study.

_____ _____

Printed Name of Person Obtaining Consent Study Role

_____ _____

Signature of Person Obtaining Consent Date

Appendix D

Assent Form

Child's ID #: _____

The point of this study is for speech therapists to learn more about the way I talk. If I want to participate in this study, my voice will be recorded while I am having a conversation with my _____.
(therapist/parent)
I will also listen to my _____ read a story. Then, I will tell him / her the same story.
(therapist/parent)
I can take breaks when I need to. The conversation will take 10 to 15 minutes and the story will take about 20 minutes.

I understand that I can change my mind at any time and not participate. (Yes / No)

I would like to participate in this research study, so speech therapists can find out more about my language and help me talk better. (Yes / No)

Describe child's verbal consent:
_____

Appendix E

Conversational Sample Elicitation Directions

**These directions were taken from the Systematic Language Sample Transcription (SALT) Database.

Directions

Use one or more of the following conversational topics. Suggested questions and prompts are listed for each topic. Introduce at least one topic absent in time and space from the sampling condition, e.g. for holidays, "What did you do?" or "What will you do?".

1. Classroom activities

"Tell me about some of the things you've been doing in school lately."

2. Holidays

"Did you do anything special for Halloween (or appropriate holiday)?"

" Tell me about that."

"Are you going to do anything special for Christmas?"

3. Family activities, visits, locations, etc.

"Are you going to visit your grandma and grandpa?"

"Where do they live?" "How do you get there?" "What do you do there?"

4. Family pets

"Do you have any pets at home?" "Tell me about them."

"What do you have to do to take care of them?"

5. Play situation for young children

For young children, you may need to elicit the conversational sample in a play situation such as playing with playdough or small toys. Follow the child's suggestions, request directions etc., comment on the child's activity.

"I've bought some play dough for us to play with today. I wonder what we could make together?"

"Let's make ---. What do we need to do to make it?"

"Here are two cows. What should we do with them?"

"What other animals go in the barn?"

Elicitation Tips

- Avoid discussing topics that are overly personal to protect your privacy.
- Avoid discussing narrative and story plots during conversation.
- Avoid yes/no questions or questions that require a one-word response. Use open-ended questions.
- Request for clarification if something is unclear
- Don’t be afraid of pause time. Be patient.

- Redirect your child back to the topic of interest by asking them a question about the topic or directly saying, “We were talking about _____, remember?” or “Let’s keep talking about _____.”

- If your child has a favorite activity that they will discuss at length with you, you may also discuss that topic instead of the topics listed above. You may want to prepare questions ahead of time about your chosen topic to keep conversation going.
- You will be notified when you can end the conversation and a large enough sample has been collected.
- Please watch the video on elicitation methods by following the link: http://www.saltsoftware.com/onlinetraining/section-page?OnlineTrainingCourseSectionPageId=44

Appendix F

Narrative Sample Elicitation Directions

** These directions were taken from the Systematic Analysis of Language Transcripts (SALT) website.

These stories are from wordless picture books, so scripts were provided ahead of time before recording the sample.

1. Say "**First, I am going to tell you a story while we follow along in the book. When I have finished telling you the story, it will be your turn to tell the story using the same book.**" Practice reading the script you were provided before you are recorded reading to the child. This will make the situation seem more natural and less staged.
2. After telling the story, say "**Now I would like you to use your own words to tell the story."**
3. Turn the book to the first page with pictures and say "**Do the best that you can. Now you tell me the story.**"

[Story Script on Following Pages]

Pookins Gets Her Way

By Helen Lester

Page	Text
1	
2	
3	Pookins was used to getting her own way.
4	If Pookins did not get her own way she would make faces,
5	throw apples, and yell very loudly.
6	And because nobody wanted her to make faces, throw apples, and yell very loudly, Pookins always got her own way. She had ice cream for breakfast.
7	She never ate her vegetables.
8	She did not pick up her clothes, and she got all the toys she ever asked for.
9	
10	She roller-skated in the living room.
11	And she went to bed very late, sometimes even after the owls.
12	
13	One day Pookins went out for a skip. She wore the party dress she was supposed to save for parties--just because she felt like it. Before long she met a magic gnome.
14	He asked, “What can I do for you?” “Lots,” said Pookins. “I want three wishes. First I want a pair of cowboy boots, or else I’ll make faces, throw apples, and yell very loudly.”
15	The gnome rubbed his magic hat and Pookins got her cowboy boots.
16	“Now,” demanded Pookins, “I want a beautiful queen hat. Make sure it has plenty of diamonds, or else I’ll make faces, throw apples, and yell very loudly.” Pookins got her queen hat – with plenty of diamonds.
17	“And finally,” she said, “I want to become a flower, the prettiest flower in the world.” The magic gnome looked at Pookins and asked, “Are you sure you want to become a flower?” “If you don’t let me become a flower,” warned Pookins, “I’ll make faces, I’ll throw…” “Never mind,” said the gnome.
18	“Becoming a flower is not easy,” said the gnome. “First we must put you in a pot.”
19	“Then you need some nice soil around your roots.” He dumped a load of dirt all over Pookins lovely new cowboy boots.
20	“And of course you will need plenty of water.” The gnome gave Pookins a good watering all over. Soon the soil felt very squishy in the pot.
21	“Finally,” chirped the gnome, “you must stand in the sun for hours and hours and hours.” And with that he rubbed his magic hat.
22	
23	There stood Pookins. In the sun. In a pot. Very wet. Up to her ruffles in soil.
24	Hours and hours and hours and even more hours passed.
25	Pookins was a flower.
26	By this time Pookins decided that getting her own way wasn’t so much fun after all. “Let me out of this pot,” she cried, “or else—“ “Or else what?” asked the gnome.

27	“Flowers can’t throw apples or yell loudly, and I can hardly see your face through all those petals. You wanted your own way and I gave it to you.” Pookins felt very sorry for herself and began to cry.
28	Suddenly without warning it began to rain. “My hat, my magic hat,” cried the gnome. “It will shrink and I will lose my powers.” For the first time Pookins felt sorry for the gnome. “Get under my petals. I’ll keep you dry,” she said.
29	
30	The gnome stayed there until the rain stopped. “Pookins,” he said, “you helped me so I will help you, on one condition. You must put all of your bad faces, loud yells, and apples into my magic hat forever. Then I will let you out of the pot.” Pookins quickly agreed.
31	The magic gnome then rubbed his hat and Pookins was no longer a flower.
32	The happy Pookins skipped quickly home. And she only kept one small apple—just in case.

Appendix G

NSS Rubric for *Pookins Gets Her Way* by Helen Lester (1987)

Characteristic	**Proficient** (5)	**Emerging** (3)	**Minimal/Immature** (1)
Introduction	-States that there is a little girl named Pookins who is used to getting her own way, and if she doesn't get her way she'll make bad faces, yell loudly, and throw apples.	Child only mentions: -Pookins is used to getting her own way (no mention that there are consequences when she doesn't get her own way) **OR** -Pookins throws apples, etc. (without mentioning who Pookins is and why she throws apples)	Launches into story without mentioning that Pookins always gets her way, and if she doesn't, there are consequences.
Character Development	-Both Pookins and the gnome are described by key behavioral, social, and/or emotional traits. *For example:* *Gnome: Describing the gnome as being magical in some way and offering to help Pookins.* *Pookins: Describing Pookins as being naughty in some way and/or as someone who does mischievous things.* **AND** -Narrates in first person when appropriate.	-Describes only one character using many behavioral, social, and/or emotional traits. **OR** -Child uses weak descriptions or same kind of descriptions and/or traits throughout story for either one or both characters (minimal character information). **AND/OR** -Minimal narration in first person	-Does not mention any characteristics about either Pookins or the gnome. **AND** -No narration in first person.
Mental and Emotional States	-All mental and emotional states are provided when necessary for plot development and advancement. -Use of affective states (e.g., sorry, happy) and mental states (e.g., wants, felt, need, decided) *Child may use mental and emotional states not mentioned in the elicitation procedure.*	-Some emotional and mental states are stated in some, not all, situations. **OR** -Repetition of only one or two emotional and mental states.	-No use of mental or emotional states.
Referencing/Listener Awareness	-Provides all references *(including correct character names and appropriate pronouns)* and adequate background information (of characters, settings, and events), -Cues into listener's awareness of the story -Listener can follow the story without requesting clarification.	-Does not provide ALL information necessary to make connections between characters, settings, and events.	-Presupposes shared listener knowledge and does not cue into the listener's signs of confusion.
Conflict/Resolution	All 6 major conflicts/resolutions necessary for plot advancement are present and clear regarding characters and events including some mention of: 1. Pookins doesn't get her way /She makes faces, yells loudly, and throws apples 2. Gnome asks what he can do for Pookins and Pookins makes wishes/Gnome grants wishes 3. Gnome turns Pookins into flower/ Pookins decides that getting her own way isn't so much fun after all 4. Pookins wants to get out of the pot, Gnome doesn't let her out/Pookins begins to cry 5. Gnome is worried about magic hat losing its powers/ Pookins feels sorry for the gnome for the first time and puts him under her petals to keep him dry 6. Gnome tells Pookins that he'll turn her back if she puts her bad faces, loud yells, and apples into the magic hat forever/ Pookins does (For a detailed list of conflicts/resolutions, see addendum)	-3 of 6 of the major conflicts/resolutions necessary for plot advancement are included. **OR** -Most of the major conflicts/resolutions included but underdeveloped (e.g., lacking supporting details).	-Story contains 1 or none of the 6 major conflicts/resolutions necessary for plot advancement. **OR** -Conflicts/Resolutions are so underdeveloped or unresolved the story does not make sense to the listener.

Cohesion	-All events are in a logical/appropriate order **AND** -Supporting details are included at a logical/ appropriate place in the story **AND** -Smooth transitions between events (e.g., and, then, next, etc) **AND** -Child uses appropriate pause time and minimal revisions/reformulations.	-Some events and supporting details included in a logical/ appropriate order. **AND/OR** -Little variation or use of transitional words or phrases. **AND/OR** -Some pauses and/or some revisions/reformulations present in narrative	-Most events and supporting details follow illogical order. **AND** -No variation or use of transitional words or phrases. **AND/OR** -Child uses excessive pause time and/or many revisions/reformulations.
Conclusion	-Smooth transition to conclusion. -Story is clearly wrapped up with some mention of ALL three : 1. Pookins promises to be good. 2. Pookins turns back into a girl. 3. Pookins kept one apple just in case.	-Mentions only 2 of the 3 necessary endings **AND/OR** -Provides some verbal indication that the retell is complete (e.g., the end).	-Child abruptly ends story (e.g., stops narrating and listener may need to confirm that retell has ended).

Scoring: Each characteristic receives a scaled score 0-5. Proficient characteristics=5, Emerging=3, Minimal/Immature=1. Scores in between are undefined, use judgment. Scores of 0 and NA are defined below. A composite is scored by adding the total of the characteristic scores. Highest score possible=35.

* **A score of 0** is given for CHILD errors (i.e., telling the wrong story, conversing with examiner, not completing/refusing task, abandoned utterances, unintelligibility, poor performance, components of rubric are given in imitation-only manner).
* **A score of NA** (non-applicable) is given for MECHANICAL/EXAMINER/OPERATOR errors (i.e., interference from background noise, issues with recording, examiner quitting before child does, examiner not following protocol, examiner asking overly specific or leading questions rather than using open-ended questions or prompts.

Appendix H

Conversation Sample Codes

[EW:word] marks word-level errors

[EU] marks utterance-level errors

[C] marks contingent responses

[NC]marks non-contingent responses

Contingent responses are marked:

[EX1] for Expansion

[SE] for Self-expansion

[A] for Alternation

[EX2] for Expatiation